AMENDMENTS TO THE CLAIMS

Kindly amend the claims as follows:

1. (currently amended) A method for forming a buried plate in a trench capacitor, the method comprising the steps of:

forming at least one trench with a sidewall in a semiconductor substrate;

non-conformally partially filling the trench with a dopant source material to form a dopant source having a ~~substantially planar~~ top surface below a top of the trench, the dopant source material containing at least one dopant;

covering the sidewall of the trench above the dopant source with a second material;

heating the substrate to cause the dopant to diffuse into the substrate in the trench not covered by the second material, thereby forming the buried plate; and

removing the dopant source material from the trench.

2. (original) The method of Claim 1, wherein the semiconductor substrate is formed of silicon.

3. (currently amended) A method for forming a buried plate in a trench capacitor. the method comprising the steps of:

forming at least one trench with a sidewall in a semiconductor substrate;

non-conformally filling the trench with a dopant source material to form a dopant source having a top surface at or above a top of the trench;

recessing the top surface of the dopant source below the top of the trench;

covering the sidewall of the trench above the dopant source with a second material;

heating the substrate to cause the dopant to diffuse into the substrate in the trench not covered by the second material, thereby forming the buried plate; and

removing the dopant source material from the trench.

4. (original) The method of Claim 1, wherein the dopant source material is arsenic-doped glass.

5. (previously presented) The method of Claim 29, wherein the dielectric collar is formed of nitride.

6. (original) The method of Claim 5, wherein the dielectric collar is formed by low pressure chemical vapor deposition.

7. (original) The method of Claim 5, further comprising the step of forming a thin layer of oxide on the sidewall of the trench prior to forming the dielectric collar.

8. (previously presented) The method of Claim 3, wherein the substrate is heated to a temperature of about 800 C to about 1200 C, for a time of about 1 to about 60 minutes.

9. (original) The method of Claim 8, wherein the substrate is heated to a temperature of about 1050 C.

10. (currently amended) The method of Claim 3, wherein the substrate is heated in an oxygen-containing atmosphere.

11. (previously presented) A method for forming a buried plate in a trench capacitor , the method comprising the steps of:

forming at least one trench with a sidewall in a semiconductor substrate;

partially filling the trench with a dopant source material to form a dopant source having a top surface below a top of the trench, the dopant source material containing at least one dopant;

covering the sidewall of the trench above the dopant source with a second material;

heating the substrate to cause the dopant to diffuse into the substrate in the trench not covered by the second material, thereby forming the buried plate, wherein the substrate is heated in an oxygen-containing atmosphere, and wherein during the heating step, a layer of oxide is grown between the dopant source material and the substrate; and

removing the dopant source material from the trench.

12. (original) The method of Claim 11, further comprising the step of removing the layer of oxide, thereby forming a bottle-shaped trench.

13. (previously presented) The method of Claim 3, further comprising the step of depositing a plurality of hemispherical grains in the trench after the dopant source material is removed.

14. (previously presented) The method of Claim 3, further comprising the step of removing the second material.

15. (previously presented) The method of Claim 3, further comprising the step of etching the substrate in the lower portion to form a bottle shape trench after the dopant source material is removed.

16. (original) The method of Claim 15, wherein the substrate is etched using ammonia.

17. (previously presented) The method of Claim 3, wherein the sidewall of the trench is covered by depositing the second material on the dopant source, thereby filling the remainder of the trench and covering the sidewall of the trench above the dopant source.

18-20. (canceled)

21. (original) The method of Claim 17, wherein the second material is un-doped oxide.

22. (original) The method of Claim 21, wherein the second material is deposited by low pressure chemical vapor deposition or high density plasma chemical vapor deposition.

23-26. (canceled)

27. (previously presented) The method of Claim 3, further comprising the step of exposing the substrate to at least one of gas phase doping, plasma doping and plasma immersion ion implantation.

28. (original) The method of Claim 13, further comprising the step of exposing the substrate to at least one of gas phase doping, plasma doping and plasma immersion ion implantation, after depositing a plurality of hemispherical grains.

29. (previously presented) The method of Claim 3, wherein the sidewall of the trench is covered by forming a dielectric collar on the sidewall above the dopant source.

30. (new) The method of claim 1 wherein said filling is such that at least one cross-section of said dopant source material substantially perpendicular to said sidewall at or near said top surface of said dopant source material is non-annular.

31. (new) The method of claim 1 wherein said filling is such that at least one cross-section of said dopant source material substantially perpendicular to said sidewall closer to said top surface of said dopant source material than to a bottom of said trench is non-annular.

32. (new) The method of claim 3 wherein said filling and recessing are such that at least one cross-section of said dopant source material substantially perpendicular to said sidewall at or near said top surface of said dopant source material is non-annular.

33. (new) The method of claim 3 wherein said filling and recessing such that at least one cross-section of said dopant source material substantially perpendicular to said sidewall closer to said top surface of said dopant source material than to a bottom of said trench is non-annular.

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